Lithology, Well Construction, and Historical Water-Level Data from South Carolina's National Ground-Water Monitoring Network Registry Wells

Prepared By

Brooke Czwartacki

South Carolina Department of Natural Resources, Hydrology Section

217 Fort Johnson Road

Charleston SC 29412

843-953-9334

czwartackib@dnr.sc.gov

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SUMMARY

The South Carolina Department of Natural Resources (SCDNR) serves as a data provider to the National Ground-Water Monitoring Network (NGWMN). In October 2015, SCDNR entered into a one-year cooperative agreement with the United States Geological Survey (USGS) with a purpose to integrate information from wells routinely measured by South Carolina into the NGWMN. A total of 438 well sites were integrated into the network. Initially, basic information regarding location, depth, aquifer, current water-level data and water-level characteristics were integrated into the national network. More information regarding the installation and historical records was needed; therefore, SCDNR entered into a second cooperative agreement beginning in October 2016 to provide lithology, well-construction, and historical water-level data for these wells. Filling data gaps is necessary to provide the best available data for wells included in the NGWMN. This report describes activities related to filling those data gaps.

BACKGROUND

The SCDNR Water Well Database is an online inventory of 13,781 wells available through the SCDNR Hydrology Coastal Plain Water Well Records webpage. Wells are accessible online at: http://www.dnr.sc.gov/water/hydro/WellRecords/Wells_main.htm. SCDNR Water Well inventory data are searchable through an Esri Map application organized by alpha numeric county identification codes. Summary information is available includes well location, county code well identification, well ownership, construction details, water yield and primary use. Also indicated is the presence of drill logs, geophysical logs, pumping tests, and chemical analyses. The SCDNR Water Well Database includes wells that have been inventoried from various data sources over past 50 years

A subset of 438 wells have been integrated into the NGWMN (Figure 1). These wells are regularly measured and include selected wells belonging to a baseline SC Groundwater Monitoring Network (170 wells) or are part of the larger synoptic network (approximately 600 wells). Current and accurate information is known about wells belonging to these two networks, which made them good candidates for inclusion in the NGWMN. Historically, SCDNR has stored detailed information about inventoried wells as paper records. As a NGWMN data provider, additional information from SC wells that describes lithology, well-construction, and historical water-levels was needed. This need prompted the review and digitizing of paper records into a format that could be accessed via the NGWMN data portal.

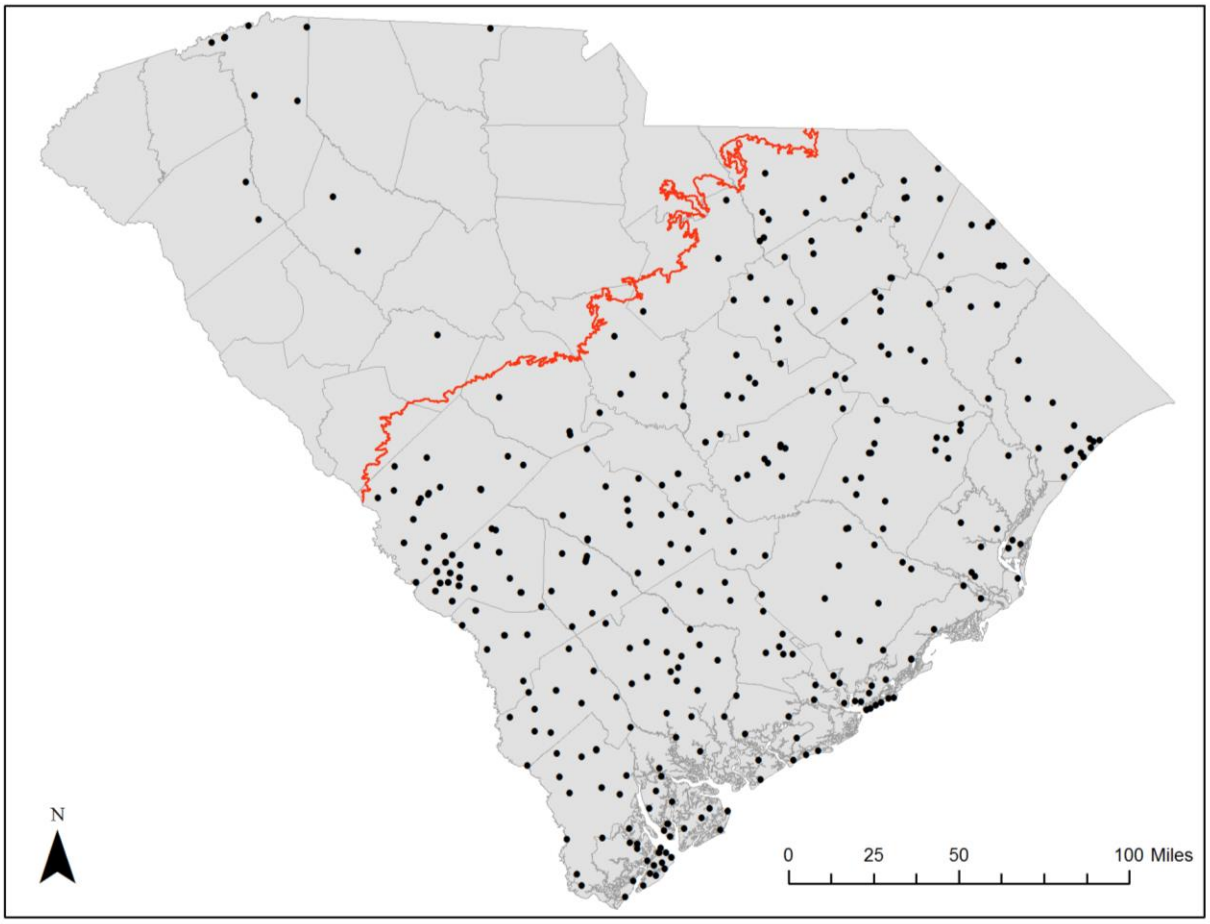

Figure 1. Map showing locations of National Ground-Water Monitoring Network registry wells.

SOUTH CAROLINA WATER WELL RECORDS

SCDNR houses paper water-well records at the main DNR office located in Columbia. Additional copies of the 8 coastal counties are housed in Charleston at DNR's Fort Johnson campus. A county number is used to identify wells. The county name is abbreviated using three letters and a number is assigned based on the order the well was inventoried. Each well file contains all available or known information collected for that well. Most well files at a minimum, contain location, well-construction, and owner information. Many others have additional information including, drilling logs, geophysical logs, pump and chemical testing results, and historical water-levels.

In an effort to fill data gaps for wells included in the national registry, paper well files and paper reports were reviewed by SCDNR staff. Descriptions of lithology, well-construction, and historical water-levels were located and entered into an Access database. Not all information could be located or was available for each well. In the sections below, lithology, well-construction, and water-level information is defined and described. Table 1 summarizes the data available for inclusion in the NGWMN.

Lithology

Lithologic information describe the physical characteristics of sediments observed at depth for a particular well. These lithological descriptions are recorded directly from cuttings of borehole sediments or are indirectly inferred from a nearby corehole. Lithology is recorded from observing collected sediment samples at specified intervals (usually 5 feet), and describing physical characteristics including color, size, shape, sorting, and composition. Lithology information is collected by a well drilling contractor and is described either by the driller or by a geologist; therefore, a standardized procedure is not followed. However, these descriptions help identify the location of confining layers and water-bearing layers. They can also reveal the geologic time in which the sediments were deposited based on the presence or absence of certain fossils or minerals.

Historically, SCDNR has stored lithology data as paper records. As part of this effort, SCDNR digitized these records to make them available for inclusion in the NGWMN data portal. Not all wells in the registry have lithology data. Several of the SCDNR wells belong to well-cluster sites, where wells have been completed in different aquifers. Due to the close proximity of those wells, not all of the wells had lithology described. Lithologic information collected at the deepest borehole (or a nearby corehole) represents all wells in the well cluster. Wells that belong to a cluster site (denoted P- or C-) are identified in the summary table.

Well Construction

Well construction data includes all information related to the dimensions and depth of the well. These measurements are always expressed as feet below land surface. SCDNR has information regarding total drilled depth, completed depth, well diameter (inches), and depth to the top and bottom of the screened interval or depth to the top of the open-hole interval. The drilled depth indicates the depth to which the well was drilled. The completed depth indicates the depth to which the well was completed. The screened interval is the depth to the top and bottom of the screened interval. Open-hole construction refers to wells that have casing to a certain depth, and then are open to the dimensions of the borehole extending to the total depth. All available well-construction information for NGWMN wells have been digitized and entered into a database.

Historical Water-level data

Historical water-level data refers to the earliest record of water level at a given well. Water-level is usually expressed in feet below land surface. Historical water-levels have been collected at a measuring point using either a steel water level tape, an electric water level tape, or with a pressure test gage for wells that have artesian pressure. These water-level data do not include continuous head measurements collected with an automatic data recorder.

Historical water-levels for SCDNR wells were located from driller records, old paper records, past hydrology reports, and potentiometric maps. Since approximately 1995, water levels have been recorded in a digital format. All available historical water-level information for NGWMN Registry wells have been located and entered into a database.

Table 1. Summary of available lithology, well construction, and historical water-level data for NGWMN well sites. In the lithology column, if the record is blank, no lithology was recorded. Wells belonging to cluster-sites share lithologic descriptions.

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
AIK-0470	✓	✓	✓	
AIK-0497	✓	✓	✓	
AIK-0643	✓	✓	✓	P-16
AIK-0817	✓	✓	✓	C-2
AIK-0824	✓	✓	✓	C-2
AIK-0826	✓	✓	✓	C-3
AIK-0831	✓	✓	✓	
AIK-0847	✓	✓	✓	C-3
AIK-0849	✓	✓	✓	C-3
AIK-0859	✓	✓	✓	P-16
AIK-0865	✓	✓	✓	P-29
AIK-0867	✓	✓	✓	P-16
AIK-0869	✓	✓	✓	P-16
AIK-0871	✓	✓	✓	P-16
AIK-0875	✓	✓	✓	P-26
AIK-0877	✓	✓	✓	P-26
AIK-0889	✓	✓	✓	P-29
AIK-0892	✓	✓	✓	P-30
AIK-0894	✓	✓	✓	P-30
AIK-0897	✓	✓	✓	P-30
AIK-2379	✓	✓	✓	C-1
AIK-2380	✓	✓	✓	C-1
AIK-2449	✓	✓	✓	
AIK-2450	✓	✓	✓	
AIK-2468	✓	✓	✓	
AIK-2544		✓	✓	
AIK-2564	✓	✓	✓	
AIK-2711		✓	✓	
AIK-2712		✓	✓	
AIK-2720	✓	✓	✓	
ALL-0330		✓	✓	
ALL-0358	✓	✓	✓	C-7
ALL-0363	✓	✓	✓	C-7
ALL-0365	✓	✓	✓	C-7
ALL-0367	✓	✓	✓	C-7
ALL-0371	✓	✓	✓	C-10
ALL-0372	✓	✓	✓	C-10
ALL-0373	✓	✓	✓	C-10

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
ALL-0375	✓	✓	✓	C-10
ALL-0376	✓	✓	✓	C-10
ALL-0377	✓	✓	✓	C-10
ALL-0378		✓	✓	C-13
ALL-0408	✓	✓	✓	
ALL-0442		✓	✓	
AND-0326		✓	✓	
BAM-0022		✓	✓	
BAM-0026	✓	✓	✓	
BAM-0027	✓	✓	✓	
BAM-0031	✓	✓	✓	
BAM-0033		✓	✓	
BAM-0068	✓	✓	✓	
BAM-0077	✓	✓	✓	
BAM-0081		✓	✓	
BFT-0010	✓	✓	✓	
BFT-0011	✓	✓	✓	
BFT-0101		✓	✓	
BFT-0133	✓	✓	✓	
BFT-0181		✓	✓	
BFT-0420	✓	✓	✓	
BFT-0429		✓	✓	
BFT-0441		✓	✓	
BFT-0452	✓	✓	✓	
BFT-0454		✓	✓	
BFT-0455	✓	✓	✓	
BFT-0488		✓	✓	
BFT-0559	✓	✓	✓	
BFT-0563	✓	✓	✓	
BFT-0564	✓	✓	✓	
BFT-0566	✓	✓	✓	
BFT-0570		✓	✓	
BFT-0709	✓	✓	✓	
BFT-0787	✓	✓	✓	
BFT-0844		✓	✓	
BFT-1736		✓	✓	
BFT-1809	✓	✓	✓	
BFT-1813		✓	✓	
BFT-1814		✓	✓	
BFT-1820		✓	✓	
BFT-1822		✓	✓	

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
BFT-1845	✓	✓	✓	
BFT-1846	✓	✓	✓	
BFT-1925		✓	✓	
BFT-2055	✓	✓	✓	
BFT-2245		✓	✓	
BFT-2247		✓	✓	
BFT-2309		✓	✓	
BFT-2314		✓	✓	
BFT-2404		✓	✓	
BFT-2408		✓	✓	
BRK-0035		✓	✓	
BRK-0046	✓	✓	✓	
BRK-0048		✓	✓	
BRK-0089	✓	✓	✓	
BRK-0141	✓	✓	✓	
BRK-0166	✓	✓	✓	
BRK-0174		✓	✓	
BRK-0523	✓	✓	✓	
BRK-0595	✓	✓	✓	
BRK-0644	✓	✓	✓	
BRK-0647		✓	✓	
BRK-0654		✓	✓	
BRN-0062	✓	✓	✓	
BRN-0078		✓	✓	
BRN-0243	✓	✓	✓	P-13
BRN-0246	✓	✓	✓	P-15
BRN-0295	✓	✓	✓	
BRN-0303	✓	✓	✓	P-19
BRN-0312	✓	✓	✓	P-17
BRN-0313	✓	✓	✓	P-18
BRN-0314	✓	✓	✓	P-22
BRN-0322	✓	✓	✓	P-15
BRN-0323	✓	✓	✓	P-13
BRN-0324	✓	✓	✓	P-14
BRN-0325	✓	✓	✓	P-14
BRN-0328	✓	✓	✓	P-13
BRN-0331	✓	✓	✓	P-15
BRN-0335	✓	✓	✓	P-21
BRN-0341	✓	✓	✓	P-13
BRN-0345	✓	✓	✓	P-15
BRN-0349	✓	✓	✓	C-6

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
BRN-0351	✓	✓	✓	C-6
BRN-0352	✓	✓	✓	C-6
BRN-0353	✓	✓	✓	C-6
BRN-0358	✓	✓	✓	C-5
BRN-0360	✓	✓	✓	C-5
BRN-0362	✓	✓	✓	P-17
BRN-0363	✓	✓	✓	
BRN-0365	✓	✓	✓	C-5
BRN-0367	✓	✓	✓	C-5
BRN-0379	✓	✓	✓	P-25
BRN-0380	✓	✓	✓	P-27
BRN-0384	✓	✓	✓	P-23
BRN-0388	✓	✓	✓	P-17
BRN-0389	✓	✓	✓	P-17
BRN-0390	✓	✓	✓	P-18
BRN-0394	✓	✓	✓	P-19
BRN-0396	✓	✓	✓	P-19
BRN-0398	✓	✓	✓	P-20
BRN-0399	✓	✓	✓	P-20
BRN-0402	✓	✓	✓	P-21
BRN-0404	✓	✓	✓	P-21
BRN-0405	✓	✓	✓	P-21
BRN-0406	✓	✓	✓	P-22
BRN-0408	✓	✓	✓	P-22
BRN-0409	✓	✓	✓	P-22
BRN-0415	✓	✓	✓	P-23
BRN-0416	✓	✓	✓	P-23
BRN-0417	✓	✓	✓	P-24
BRN-0418	✓	✓	✓	P-24
BRN-0419	✓	✓	✓	P-24
BRN-0420	✓	✓	✓	P-24
BRN-0424	✓	✓	✓	P-25
BRN-0427	✓	✓	✓	P-25
BRN-0429	✓	✓	✓	P-25
BRN-0430	✓	✓	✓	P-27
BRN-0431	✓	✓	✓	P-27
BRN-0432	✓	✓	✓	P-27
BRN-0433	✓	✓	✓	P-27
BRN-0434	✓	✓	✓	P-27
BRN-0436	✓	✓	✓	P-18
BRN-0437	✓	✓	✓	P-18

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
CAL-0002		✓	✓	
CAL-0115	✓	✓	✓	
CAL-0192	✓	✓	✓	Creston Cluster
CAL-0193	✓	✓	✓	Creston Cluster
CAL-0194	✓	✓	✓	Creston Cluster
CAL-0195	✓	✓	✓	Creston Cluster
CAL-0196		✓	✓	
CHN-0002	✓	✓	✓	
CHN-0044		✓	✓	
CHN-0101		✓	✓	
CHN-0163	✓	✓	✓	
CHN-0172	✓	✓	✓	
CHN-0173	✓	✓	✓	
CHN-0174	✓	✓	✓	
CHN-0178	✓	✓	✓	
CHN-0182	✓	✓	✓	
CHN-0183	✓	✓	✓	
CHN-0185	✓	✓	✓	
CHN-0186	✓	✓	✓	
CHN-0187	✓	✓	✓	
CHN-0219		✓	✓	
CHN-0363		✓	✓	
CHN-0366		✓	✓	
CHN-0387		✓	✓	
CHN-0460	✓	✓	✓	
CHN-0484		✓	✓	
CHN-0601	✓	✓	✓	
CHN-0603	✓	✓	✓	
CHN-0604	✓	✓	✓	
CHN-0635	✓	✓	✓	
CHN-0801	✓	✓	✓	
CHN-0803	✓	✓	✓	
CHN-0849	✓	✓	✓	
CHN-0989	✓	✓	✓	
CHN-0990		✓	✓	
CHN-0991		✓	✓	
CLA-0016	✓	✓	✓	
CLA-0020	✓	✓	✓	
CLA-0025	✓	✓	✓	
CLA-0027	✓	✓	✓	
CLA-0030	✓	✓	✓	

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
CLA-0033	✓	✓	✓	
CLA-0036	✓	✓	✓	
CLA-0061	✓	✓	✓	
CLA-0063		✓	✓	
CLA-0146	✓	✓	✓	
CLA-0148	✓	✓	✓	
CLA-0213	✓	✓	✓	
COL-0030		✓	✓	
COL-0049	✓	✓	✓	
COL-0050	✓	✓	✓	
COL-0073		✓	✓	
COL-0092	✓	✓	✓	
COL-0096	✓	✓	✓	
COL-0097	✓	✓	✓	
COL-0170		✓	✓	
COL-0232	✓	✓	✓	
COL-0255	✓	✓	✓	
COL-0269		✓	✓	
COL-0273		✓	✓	
COL-0301	✓	✓	✓	
COL-0788		✓	✓	
COL-0789		✓	✓	
COL-0792		✓	✓	
COL-0793		✓	✓	
COL-0794		✓	✓	
COL-0795		✓	✓	
COL-0796		✓	✓	
COL-0797		✓	✓	
CRK-0074		✓	✓	
CTF-0044	✓	✓	✓	
CTF-0056		✓	✓	
CTF-0080	✓	✓	✓	
CTF-0081	✓	✓	✓	
CTF-0189		✓	✓	
CTF-0197		✓	✓	
CTF-0221	✓	✓	✓	
CTF-0222	✓	✓	✓	
CTF-0224	✓	✓	✓	
CTF-0313	✓	✓	✓	
DAR-0094	✓	✓	✓	
DAR-0096		✓	✓	

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
DAR-0098	✓	✓	✓	
DAR-0118	✓	✓	✓	
DAR-0212	✓	✓	✓	
DAR-0221	✓	✓	✓	
DAR-0228	✓	✓	✓	
DAR-0230		✓	✓	
DAR-0231	✓	✓	✓	
DIL-0028		✓	✓	
DIL-0070	✓	✓	✓	
DIL-0079	✓	✓	✓	
DIL-0121	✓	✓	✓	
DIL-0129	✓	✓	✓	
DIL-0132	✓	✓	✓	
DIL-0170	✓	✓	✓	
DIL-0171	✓	✓	✓	Dillon Cluster
DIL-0172	✓	✓	✓	Dillon Cluster
DIL-0173	✓	✓	✓	Dillon Cluster
DIL-0174	✓	✓	✓	Dillon Cluster
DIL-0175	✓	✓	✓	Dillon Cluster
DOR-0030		✓	✓	
DOR-0049		✓	✓	
DOR-0051	✓	✓	✓	
DOR-0058	✓	✓	✓	
DOR-0068	✓	✓	✓	
DOR-0088	✓	✓	✓	
DOR-0155		✓	✓	
DOR-0221		✓	✓	
DOR-0228	✓	✓	✓	
DOR-0240		✓	✓	
FLO-0085	✓	✓	✓	
FLO-0095	✓	✓	✓	
FLO-0128	✓	✓	✓	
FLO-0146	✓	✓	✓	
FLO-0148	✓	✓	✓	
FLO-0153	✓	✓	✓	
FLO-0156	✓	✓	✓	
FLO-0207	✓	✓	✓	
FLO-0209	✓	✓	✓	
FLO-0274	✓	✓	✓	
FLO-0276	✓	✓	✓	
FLO-0298	✓	✓	✓	

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
FLO-0317	✓	✓	✓	
FLO-0474		✓	✓	
FLO-0475		✓	✓	
GEO-0077	✓	✓	✓	
GEO-0078		✓	✓	
GEO-0095	✓	✓	✓	
GEO-0153		✓	✓	
GEO-0154		✓	✓	
GEO-0232		✓	✓	
GEO-0233		✓	✓	
GEO-0249		✓	✓	
GEO-0296	✓	✓	✓	
GEO-0381	✓	✓	✓	
GEO-0382	✓	✓	✓	
GEO-0383	✓	✓	✓	
GRV-0712		✓	✓	
GRV-2162		✓	✓	
GRV-2230		✓	✓	
GRV-2543		✓	✓	
GRV-3333		✓	✓	
GRV-3335		✓	✓	
GRV-3336		✓	✓	
GRV-3341		✓	✓	
GRV-3342		✓	✓	
GRV-3533		✓	✓	
HAM-0050		✓	✓	
HAM-0051		✓	✓	
HAM-0072	✓	✓	✓	
HAM-0073	✓	✓	✓	
HAM-0076	✓	✓	✓	
HAM-0079	✓	✓	✓	
HAM-0083		✓	✓	
HAM-0174		✓	✓	
HAM-0180	✓	✓	✓	
HAM-0181		✓	✓	
HAM-0261		✓	✓	
HAM-0314		✓	✓	
HAM-0315		✓	✓	
HOR-0207	✓	✓	✓	
HOR-0225		✓	✓	
HOR-0290		✓	✓	

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
HOR-0304		✓	✓	
HOR-0305		✓	✓	
HOR-0307	✓	✓	✓	
HOR-0309		✓	✓	
HOR-0332	✓	✓	✓	
HOR-0409	✓	✓	✓	
HOR-0419	✓	✓	✓	
HOR-0548	✓	✓	✓	
HOR-0666	✓	✓	✓	
HOR-0973	✓	✓	✓	
HOR-1041	✓	✓	✓	
HOR-1325	✓	✓	✓	
HOR-1326		✓	✓	
HOR-1327		✓	✓	
JAS-0298		✓	✓	
JAS-0351	✓	✓	✓	
JAS-0397		✓	✓	
JAS-0402	✓	✓	✓	
JAS-0403		✓	✓	
JAS-0406		✓	✓	
JAS-0420		✓	✓	
JAS-0421		✓	✓	
JAS-0425	✓	✓	✓	C-15
JAS-0426	✓	✓	✓	C-15
JAS-0468	✓	✓	✓	C-15
JAS-0490		✓	✓	
JAS-0491		✓	✓	
JAS-0492	✓	✓	✓	C-15
JAS-0499		✓	✓	
KER-0098		✓	✓	
KER-0100	✓	✓	✓	
KER-0263		✓	✓	
LEE-0036		✓	✓	
LEE-0060	✓	✓	✓	
LEE-0073	✓	✓	✓	
LEE-0075	✓	✓	✓	
LEE-0079		✓	✓	
LEE-0178	✓	✓	✓	
LEE-0179	✓	✓	✓	Lee State Park
LEE-0180	✓	✓	✓	Lee State Park
LEE-0181	✓	✓	✓	Lee State Park

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
LEX-0823		✓	✓	
LEX-0838	✓	✓	✓	
LEX-0844	✓	✓	✓	
LRN-1705		✓	✓	
LRN-1706		✓	✓	
LRN-1707		✓	✓	
MLB-0027	✓	✓	✓	
MLB-0031	✓	✓	✓	
MLB-0110		✓	✓	
MLB-0112		✓	✓	
MLB-0139		✓	✓	
MLB-0140		✓	✓	
MRN-0009		✓	✓	
MRN-0068		✓	✓	
MRN-0070		✓	✓	
MRN-0077		✓	✓	
MRN-0078		✓	✓	
ORG-0009	✓	✓	✓	
ORG-0048	✓	✓	✓	
ORG-0079	✓	✓	✓	
ORG-0108	✓	✓	✓	
ORG-0383		✓	✓	
ORG-0385		✓	✓	
ORG-0389		✓	✓	
ORG-0393	✓	✓	✓	
ORG-0430	✓	✓	✓	
ORG-0431	✓	✓	✓	
ORG-0461	✓	✓	✓	
ORG-0509	✓	✓	✓	
ORG-0548	✓	✓	✓	
ORG-0634		✓	✓	
ORG-0635		✓	✓	
ORG-0636		✓	✓	
ORG-0637		✓	✓	
ORG-0638		✓	✓	
ORG-0639		✓	✓	
ORG-0640		✓	✓	
ORG-0641		✓	✓	
ORG-0642		✓	✓	
RIC-0293		✓	✓	
RIC-0543	✓	✓	✓	

NGWMN Registry Well Identification	Lithology Description	Well Construction Details	Historical Water Level	Well Cluster Site
RIC-0585	✓	✓	✓	
RIC-0729		✓	✓	
RIC-0775		✓	✓	
RIC-0776		✓	✓	
SAL-0069		✓	✓	
SUM-0119	✓	✓	✓	
SUM-0146	✓	✓	✓	
SUM-0153	✓	✓	✓	
SUM-0230	✓	✓	✓	
SUM-0288		✓	✓	
SUM-0296	✓	✓	✓	
SUM-0297		✓	✓	
SUM-0355		✓	✓	
SUM-0488		✓	✓	
SUM-0492		✓	✓	
SUM-0497		✓	✓	
WIL-0012	✓	✓	✓	
WIL-0016	✓	✓	✓	
WIL-0037	✓	✓	✓	
WIL-0051		✓	✓	
WIL-0118	✓	✓	✓	
WIL-0177	✓	✓	✓	
WIL-0193	✓	✓	✓	
WIL-0196		✓	✓	
WIL-0203	✓	✓	✓	
WIL-0207	✓	✓	✓	
WIL-0208	✓	✓	✓	
WIL-0211	✓	✓	✓	
WIL-0212	✓	✓	✓	
WIL-0213		✓	✓	
WIL-0355		✓	✓	

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